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SCIENTIFIC MANAGEMENT AND SOCIALISM

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A PPARENTLY scientific management is as remote from socialism as the east is from the west, yet in reality there are few movements more effectual in promoting government ownership and operation of industry than the one fathered by efficiency engineers. Nothing could be further from the thoughts of the promoters of science in business, indeed, to many of them nothing could be more abhorrent, than the social reconstruction that logically completes their work; equally upon the other hand, socialists little dream of the powerful cooperation that will be given their aims by the men who are now attempting to reform business methods; nevertheless, the end of scientific management is socialism, for the one leads to the other in the evolution of industry. One route by which this end is reached is through the elimination of skill, another is by means of federal supervision of the foreign trade that arises as a result of the overproduction incident to the introduction of efficiency methods, and the third is the tendency that scientific management has toward installing automatic machinery, a trend that if carried to its logical conclusion—complete automatic production—would require government ownership. It is upon these three features of scientific management, namely, the elimination of skill, overproduction and the replacement of men by mechanisms, that we base our prophecy that scientific management leads to socialism. Since there are almost as many varieties of socialism as there are socialists, it should be understood at the outset that when that term is used we mean the government ownership and operation of the necessary means of production.

Scientific management has been welcomed by manufacturers because it places within their hands a new and powerful tool whereby the strength of skilled labor can be undermined and the power of employers strengthened. Ever since one man worked for another the interests of the two have been opposed in the struggle to determine wages, and a large factor in the favor of the workman has always been the skill he possessed and which the employer was forced to use, and to reward. As

long as production was simple, the recompense of any laborer was usually in proportion to the amount of skill involved in his job. The complexity introduced into production by the invention of machinery served to heighten the importance of this ancient rule, for although machines suddenly at one blow usurped a great amount of traditional skill, nevertheless, they did not eliminate entirely the employers' dependence upon skilled labor, with the consequence that under the mechanical régime ushered into industry by the industrial revolution, a man's wages more than ever depended upon the skill involved in his job. Where little or no special deftness was required the machine owner took almost all the proceeds of production, giving the laborer just enough to maintain existence. In the first flush of power in England, manufacturers went even further than this, for they paid workmen less than the exigencies of existence demanded, trusting to charity to make up the difference between wages and life necessities, a situation which was not relieved until the compulsion of national legislation and the demands of labor unions forced manufacturers to relinquish some of the advantages of their position. Highly skilled workmen, on the other hand, were able to demand and receive a share in the proceeds of production, greatly in excess of bare subsistence wages. Skilled workmen have a monopoly and as a result exert monopoly privileges; the extent to which they share in profits is determined by the degree of their monopoly.

Inasmuch as this citadel of labor prevents manufacturers from securing to themselves most of the gains of business, it stands as a constant challenge to them and spurs them onward to make every possible inroad upon their adversaries, by inventing and adopting devices which will eliminate the dependence upon skill; after years of assault of this character, although the band of men within the beleaguered fortress has grown smaller and smaller, the stronghold still maintains its integrity. *It is at this point that Scientific Management comes to the aid of machine owners, for it is virtually a new mechanism that transfers skill from the operatives to the operators, or from another point of view, it is one more step in the subdivision of labor whereby the power of workers is lessened and that of employers strengthened.*

In the past, methods of work or the manner of using a machine has been left largely to the laborers concerned, and manufacturers exercised little supervision over the exact way in which a man turned out any job. The men, unaided, developed

"rules of thumb" and secret practises satisfactory to themselves and also to the management, although the office did not know just exactly what went on in the shop. A considerable body of knowledge of this sort rested with the men and constituted a respectable portion of their "skill." Efficiency engineers set themselves the task of bringing this art under the control of the management; the first studies, therefore, were aimed at finding out just what the men knew about their jobs, and classifying, indexing and standardizing the information obtained. Then a first-class workman was studied minutely in every phase of his operations, and the motions, appliances and methods of his work analyzed to the last detail, and, finally, all the parts were synthesized into a new whole which was better than any operation ever performed by any man by himself. Thereafter, this new method of work became the standard of every worker in the plant, for no man was allowed to perform his task any longer just as he pleased, but was required to follow the rules laid down by the management; in other words, the management took over most of the "skill" and the men merely followed instructions. Scientific management, therefore, was a tremendous assault upon the bulwarks of skilled workmen, and after it began to function fully it actually permitted men of much less experience to carry out the duties which formerly required highly trained men; for instance, day laborers could be put on the more simple operations of machine work, formerly the job of well-paid machinists.

Yet, nevertheless, when first introduced, scientific management increases rather than decreases the laborer's share in the proceeds of production. Efficiency engineers gain by their analytic methods a greatly enhanced out-put with the same machines and the same labor. Of the profits which arise from the augmented product, the management usually takes two thirds and gives the men one third, a fair enough division, since part of the return may be considered as interest arising from the investment in the new "mechanism," and in addition since the men themselves did nothing to create the conditions under which alone the enlarged production was made possible. The one third share of the men so increases the wages of the workers over the customary pay for their particular class of labor that as a rule they are perfectly satisfied with the arrangement. Consequently scientific management is unlike any other innovation that has ever been introduced in industry, for all other improvements have borne harshly upon the workers immediately involved, although in the long run labor in general

was benefited; on the contrary, scientific management is advantageous to the workmen who are directly involved in it. Despite high wages, the production under scientific management is so greatly increased that the manufacturers gain a lower labor cost per unit than they formerly enjoyed; high wages in fact are granted to the men as an inducement to work faster, so that this desired output may be attained.

The secret of the success of efficiency engineering lies in the great unevenness of industry. Every step from management on the verge of bankruptcy to the most highly efficient may be found and every stage in industrial evolution from complete hand work done at home—the manufacture of women's neckwear, for example—to factory operation in which every process may be performed by machinery, as the shoe industry illustrates. *Scientific management brings profit to those few who adopt it because the great mass of their competitors is without it.* The price of the product is set by the cost of production found in the great number of plants of *average efficiency*. The scientifically managed plant with a lower cost of production than the average may do one of two things; it may lower its selling price so as to capture the whole market and make its profits by the quantity sold—after the manner of Henry Ford—or it may be satisfied with making a large profit on its smaller volume of sales by leaving the price where it is set by competitors. The second is the more usual method of procedure, because to run a very large business requires organizing ability of the highest and rarest kind, and, furthermore, the second method yields a comfortable profit without involving anywhere near as much work. However, the first method is the safer, for it gives a virtual monopoly when it is easy to acquire, since scientific management is like a machine, if it isn't "patented" and kept for one's own personal advancement, one's competitors will seize it, and hence eventually it will lose all strategic value to the first owner. If a manufacturer chooses to install scientific management and does not attempt to grasp the full monopoly privilege inherent in its possession, but uses it as he would any other piece of new equipment, he can make it pay handsomely as long as other men in the same line of business do not hire an efficiency engineer, but, just as in the case of any other mechanism, every competitor will be forced to adopt it eventually or go out of business. The profits that arise from the use of scientific management vary inversely with the number of users—to talk mathematically—hence *the increased production due to efficient methods will itself, in the long run, yield no financial returns.*

What then will become of the workman's extra wages? The answer is obvious; that, as the enlarged profits which permit bonus wages to be paid disappear, the additions to wages over and above the market rate will also vanish. The laborer will be worse off than he was in the beginning, because he will have sacrificed to a planning department belonging to the management his "skill," by which he forced high wages; and the pace at which he worked at first in order to gain extra pay will have become required without the greater compensation. Here then is the first place that scientific management will lead to socialism; the men working harder than ever, but witnessing a constant shrinkage in the contents of their weekly envelopes, yielding more and more of their traditional skill to the accurate studies of the "office" and seeing their jobs handed out to less and less trained men hired at lower wages, realizing that the employer is attaining ever greater right to the total income of production, the men will demand that the government regulate industry.

The first form such regulation will take will probably be a national minimum wage law. Once such a law is granted, it will be revised continually in order that the minimum may be raised to ever higher levels. The workers ought to be able to secure this boon in the face of the opposition of manufacturers, because the men will have the vote and can hold a political ax over congress. Massachusetts has long been acclaimed as a leader in industrial legislation whose object is betterment of labor, not because the state is any more enlightened than others, but largely on account of the fact that 50 per cent. of the people in gainful occupations are engaged in manufactures and all but 5 per cent. (4.9 in agriculture) of the remainder are more or less closely associated with the factory enterprises. The workers of the state, therefore, who are voters, have a close interest in labor laws and can force them from the legislature. Not only may the artisans of the future seek to enforce national minimum-wage laws but also they may endeavor to curtail production by lessening the hours of a work day, and make six or four hours the legal work period over the whole country. The profits of the manufacturers, already cut down by competition, will thus shrink further under the enforced higher wages and shorter hours, so, in some future crisis, when aroused labor makes greater onslaughts upon profits, the manufacturers themselves may be glad to sell their plants to the government under which they then may become managers with a salary.

The discontent that must eventually be felt by workmen on

account of scientific management may be translated into action such as we have noted, and the logical outcome of the movement of the workers against the efficiency of the managers seems to be government ownership and operation of industry—which state is synonymous with socialism. However, the manufacturers of the future may be shrewd enough to foresee this result and take measures to turn aside labor's dissatisfaction.

The scheme that most probably will appeal to employers as a way out of their difficulties is profit-sharing of some kind, even though the name and aim may be disguised under a different term. If the employees share in the profits of a business, that enterprise is socialized, and the first step toward more comprehensive socialism has been taken.

Likewise *any* device that may be adopted to appeal to laborers must have in it some germ of socialization, for otherwise the workers would disdain it. Hence any attempts manufacturers may make to soften the effects of scientific management only lead them into paths whose final goal is socialism.

The elimination of skill is by no means the only route by which scientific management leads to socialism, for not only do efficiency engineers strive to get rid of operations requiring skill, but they also bend all their energies toward increasing production. This fact gives rise to a set of forces which tend to operate in the direction of socialism.

Before the opening of the Great War, when few industrial plants were operated by efficiency methods the nation faced the necessity of a market abroad, because the mills had reached the point where their production just about filled domestic needs. The home market, therefore, was unable to absorb a surplus, with the consequence that foreign trade became most attractive to American producers. Into this situation we are now introducing scientific management, one of whose tenets is an increased output often double, sometimes triple the average of previous experience. Just as long as the new scheme of organization is limited to a few concerns, industry as a whole is little influenced by the augmented production, but, inasmuch as all concerns must eventually adopt scientific management, the nation is facing a future period when production as a whole will be at least two or three times what it is at present. The multiplication of products will tend to lower prices and thus broaden the domestic market, but it seems hardly probable that the home consumption can absorb the entire surplus, especially since the nation had already commenced to feel the effect of

glut, even before the operation of new methods of management influenced out-put. As a result, it does not take a very keen vision to predict that the United States must take an ever increasing interest in foreign trade, a movement that will precipitate an intense commercial struggle between nations for supremacy. In order to meet strenuous international competition, American factories must be so organized that they may be treated as a unit, and all wasteful practices—such as cross freight, unnecessary transportation of raw materials to plants poorly situated or needlessly long hauls for products destined for export—may be eradicated. These ends may be attained at first by government control, but regulation of industry will usually lead to ownership because mere federal methodizing will never prove entirely satisfactory. We have amply proved this in the case of railroads, for, beginning by loose regulation, federal authority over steam-railway transportation has been tightened constantly, until now even railroad presidents themselves declare that they see no relief in sight except such as may come through government ownership. In a similar manner the mere shadow of government, at first extended over foreign trade, will take on more and more substance until—as is the case with Germany—the state itself shall become the virtual dictator of foreign trade. In order to carry on its affairs satisfactorily, the government agencies in control of foreign traffic must reach backward inland to regulate the sources of production until individual factories come under its powerful sway, and then socialism will be here, although it may be called by some other name.

Starting with scientific management we have arrived at socialism a second time, but our story is not yet done, for there is a third condition that grows out of efficiency methods, and this third one, the increased use of automatic machinery, like the other two, is completed by socialism.

One of the foundations of scientific management is a study of the motions necessary for the carrying on of every process in the making of an article; it aims to simplify the motions continually in order that they may become most nearly mechanical. The next step, namely, adjusting the machine to give the mechanical equivalent of the motion instead of trusting to a man, is an easy one. Scientific management, therefore, greatly hastens the transferal of skill from men to mechanisms, and brings forward more rapidly the day when all machinery will be automatic.

It is not easy to accept this concept, for it seems like fly-

ing in the face of truth, yet we can see the tendency toward automatic machinery in every industry around us. Not many decades ago a weaver took care of just one loom, and the passing of the shuttle bearing the weft was a hand operation. One of the first improvements in looms was to kick the shuttle across the warp by a mechanical device and then power was applied to the whole operation of the loom. Later improvements augmented the number of shuttles from one to half a dozen, still later refinements threaded each one of the six shuttles automatically. Furthermore, when any thread breaks, the loom stops automatically and another machine worn on the weaver's thumb reknits the broken strand. Instead of requiring one weaver to each loom modern mills need only one for every twenty machines. It is not an idle dream to suppose that some day no men at all will be necessary for loom operation. Take another illustration from among a great number. To make a screw once required a man and a machine for each operation of heading, tapering, threading, slitting the head and cutting off, or one man had to readjust one machine five times for the five operations. To-day one machine—the turret lathe—performs all five with one adjustment and in addition feeds itself with raw material. As a result, one man can take care of ten screw machines. Is it impossible that some day that one man will not be needed?

Many people will accept the eventual automatic production of all products whose processes require mechanical repeated motions, but to them it seems incredible that machinery can ever displace men entirely, because so many operations as now conducted necessitate judgment, a faculty no machine can acquire. Nevertheless, for every action that demands judgment, there is some mechanical equivalent that will bring about the desired result. For illustrations, we are familiar with the perforated paper roll that plays pianos, the wax record that does the work of stenography, or the mathematical combination of gears that adds, subtracts and multiplies. There may be a small irreducible minimum of labor essential say for the starting and stopping of machinery, but the great mass of labor will be set free.

This stage of industry will be coming to the front rapidly in the days when scientific management is universally adopted, for efficiency engineers bend their energies constantly toward making motions simpler, easier and more mechanical in nature, and then replacing the man by a cam or a gear which performs the action better than any man could. Scientific management,

therefore, greatly promotes the use of automatic machinery. It is clear then that as the tenets of efficiency engineers are accepted by all manufacturers and as, through the engineers' studies, machinery more and more completely ousts men, that the profits of industry will go to the owners of machines even more fully, until, if allowed to go to the logical end, *capitalists will absorb all the proceeds of production because there will be no factory laborers.* To place the control and the emoluments of industry in a few hands, because the few have the money to purchase the needed automatic machines will frighten people for the reason that the few could exercise a terrible power over the many; therefore, the many will insist that the automatically operated industries be owned by the government or in other words by themselves. This means socialism.

The government ownership and operation of industry—or in other words, socialism, therefore, grows out of scientific management by three different branches. Inasmuch as scientific management tends to eliminate skill, it may come about that labor will try to retain its hold on high wages through government interference with industry; furthermore, since scientific management goes in the direction of over-production, the United States must become an exporter and, in order to compete, the government must control and perhaps endeavor to make operations as simple as possible, and when it attains the desired simplicity, change the operator from a man to a mechanism. If this tendency ever becomes a universal fact—that is, all industry conducted by means of automatic machinery, the government will be forced to own and operate industry because to place such power in private hands would be too dangerous. Because scientific management as a movement is yet young, it is worth while to make this examination into its tenets and to point out its tendencies, for our attitude toward it can then be based upon reasonable ground. If you favor socialism you ought to uphold scientific management, but if socialism is a nightmare to you, then you should condemn this new industrial revolution. It makes little difference whether or not you are pleased with scientific management because it is in industry to stay, for the same reason that machinery has been maintained; it is the most efficient method of production. Since it is economic it must become universal, and when it is everywhere employed some degree of socialism must prevail.